Staphylococcus aureus and Methicillin-Resistant *Staphylococcus aureus* in Dog Owners and Non-dog Owners

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Abstract

The objective of this study is to determine if there is a relationship between dog ownership and *Staphylococcus aureus* (SA) or Methicillin -resistant *Staphylococcus aureus* (MRSA) colonization. While there are human health benefits related to pet ownership, there is also concern that animals may contribute to the transmission of disease causing pathogens. The theoretical framework utilized was syndemics, which organizes the interaction of dogs and humans with environment and social factors.

Participants were recruited from 160 families living in suburbs of a large midwestern city. A total of 489 subjects were enrolled, 280 of which were dog owners, 209 were non- dog owners. Samples were collected from 123 dogs.

An interdisciplinary team performed home visits. Participants were asked about human health, dog health, environment, and interactions with their dog. Samples from nares were collected from the human participants. Nasal and peri-anal samples were collected from dogs. All samples were processed for colonization of SA and MRSA. A chi- squared test was used to test for differences between dog owners and non- dog owners.

One hundred of 280 (35.7%) dog owners tested positive for SA colonization, while sixty of 209 (28.7%) non dog owners tested positive (p=.062). Ninety of 280 (32.1%) tested positive for methicillin - sensitive *Staphylococcus aureus* colonization, while fifty three out of 209 (25.4%) non dog owners tested positive (P=.062). Eleven out of 280 dog owners tested positive for MRSA (3.9%), while 2 out of 209 non- dog owners tested positive for MRSA (1.0%) (p= .037).

Higher rates of MRSA colonization was observed in owners who groom their dog once a month (58.6%) compared to those who groom their dogs once a day (1.8%). Those who sometimes wash their hands after interaction had a greater occurrence of MRSA colonization (5.3%) than those who often (2.0%) or always wash their hands after interaction (2.7%).

The results of this study suggests that there is a relationship between owing a pet dog and MRSA colonization, but not MSSA colonization. Certain behaviors, including playing with a pet dog more frequently, hugging and kissing your dog, and interacting with the dog while relaxing may make pet dog owners more likely to be colonized.

Background:

MRSA, or methicillin- resistant *Staphylococcus aureus,* which was once thought to be a problem confined to medical institutions, is a growing problem among healthy children and adults. Known as community acquired MRSA (CA-MRSA), these strains are different from hospital associated MRSA strains (HA-MRSA), based on risk factors. The risk factors for CA- MRSA have not been as thoroughly studied, but are thought to include "frequent skin-to–skin contact, participation in activities that result in compromised skin surfaces, sharing potentially contaminated personal items, challenges in personal cleanliness and hygiene, and limited access to healthcare" {{ 60 Gorwitz,R.J. 2008;}}. CA-MRSA can cause a range of infections rangeing from superficial infections to deep soft- tissue abscesses, and it is the most common cause of skin infections that result in admission to the emergency room {{ 60 Gorwitz,R.J. 2008;81 Klevens,R.M. 2008;}} In addition to the impact on the community, the increased prevelance of CA-MRSA also has major implications for MRSA control in hospitals, as CA-MRSA isolates have spread into the hospitals. {{ 85 Kluytmans-Vandenbergh,M.F. 2006;}}

In animals, MRSA is believed to be a growing problem, and dogs typically present for another unrelated issue and show no signs and symptoms so that MRSA must be detected through a culture. {{ 66 Hanselman,B.A. 2008 }} . In a New York Times article, Dr. Richard Oehler, who specializes in infectious disease, recollected a case in which a diabetic man had recurrent cases of active MRSA. Eventually, his asymptomatic dog was tested and found to be a carrier. Once the dog was treated in

addition to the owner, the owner no longer had recurrent infections (5 Goodman 2009).

Pet dogs share a special bond with their human counterparts. They were most likely the first animals to be domesticated, and have shared a common environment with humans for thousands of years. Many societies puts more faith in dogs than they do with other domesticated animals. Dogs are trained to be drug detecting dogs, service dogs, cancer detecting dogs, rescue dogs, sled dogs, and hunting dogs. Dogs have also been shown to have a sensitivity to human gestures that most non human species lack. {{ 142 Reid,P.J. 2009;}} It is this special bond and interactions that humans have with their pet dogs that makes them of interest in the spread of MRSA over other common house pets.

Literature Review:

Staphylococcus aureus is a usually harmless bacteria found most commonly on human skin and anterior nares. When SA acquires the Mec A gene expressing a low affinity penicillin binding protein (PBP2a) as part of the staph cassette chromosome mec (SCCmec), the strain becomes resistant to all beta-lactam antibiotics. There are five distinct strains of MRSA, with most CA-MRSA being type IV. {{ 85 Kluytmans-Vandenbergh,M.F. 2006;}} The high virulence of MRSA has also been linked with the presence of the Panton- Valentine leukocidin (PVL) which encodes a protein that has the ability to lyse leukocytes. {{ 20 Boyle-Vavra,S. 2007;}}

The importance of pets in the spread of MRSA is illustrated when the role of pets in everyday life is considered. Studies have shown that most pet owners

describe their pets as members of their family. Three quarters of married people studied even admitted to greeting their pets upon entering the home before greeting their spouses. Numerous studies have shown that living with pets is associated with health benefits, including lower blood pressure, cholesterol, and triglyceride levels, and a greater survival rate after a heart attack. {{ 29 Cohen,S.P. 2002;}} Case clusters of MRSA suggest a strong suggestion that although animals may not show outward signs and symptoms, they can still play a role in MRSA transmission at the household level. {{ 57 Goodman,B. 2009;104 Manian,F.A. 2003;}}

Conceptual Frame of Reference

The theory of Syndemics guided the design of this study. Syndemics organizes the interaction between animals and humans, in the physical and social environment as well as the historical and cultural milleu.

In this study, the physical environment was assessed by asking participants questions about the size of their homes, number of bedrooms, and what rooms the dog frequents and sleeps. The social environment was analyzed by asking participants about interactions with their pet dogs, such as playing, hugging, kissing, and feeding table scraps from their hands. For example, interaction between a dog owner who lives in a large house, limits the dog to one room, and does not allow the dog to lick them is much different than the dog owner who lives in a smaller house where the dog is allowed free range and frequently allows the dog to lick them.

Purpose: The overall goal of this study is to study the epidemiology of SA and MRSA colonization of the anterior nares and people's interaction with pet dogs.

Research questions:

Do dog owners have a higher rate of SA or MRSA colonization compared to non-dog owners?

Does frequency of hand washing after interaction with the pet dog impact the rate of colonization of SA or MRSA in dog owners?

Are dog owners who interact with their dog more frequently more likely to be colonized with SA or MRSA than dog owners who interact with their dogs less frequently?

Methods:

Family participants from suburbs of a large Midwestern city were recruited through the data base, researchmatch.com (Harris, Scott, Lebo, Hassan, Lighter, & Pulley, 2012), fliers distributed throughout the community, and through the snowball effect (Appendix 1) For ResearchMatch participants were sent a standard invitation. The research team contacted interested participants and conducted a preliminary screening. Families whose household members had engaged in livestock operations, boarded dogs, or bred dogs within the past 6 months were not included in the study in an effort to control for exposure. Families with and without dogs were recruited to serve as a control in the study

An interdisciplinary team of veterinary and nursing students traveled to the participants' house for the arranged appointment. All participants gave consent using a standardized consent form (appendix 2) that described the procedures and risk factors associated with the visit. Children under the age of 18 had their parents

sign a parental consent form, and children age 12 and older signed an assent form to show their agreement to participate in the study. The family member who identifies as the head of the household signed a consent form for each dog participating in the study.

After the consenting process, the survey portion of the visit began (appendix 3). In Part 1, the family member who identifies as the head of the household was asked general household questions, square footage, number of years in the home, pets in the home, and occupation of household members. The question regarding their pets are broken down into dogs, cats, reptiles/amphibians, small mammals, horses, livestock, and fish and is asked in a yes/ no fashion to develop dichotomous variables. In the occupation section, participants were asked if they work with animals in a yes/no fashion to elicit another dichotomous variable.

In part 2, individual household members were asked additional questions about themselves. In the first question, participants were asked to select which race they identify with, which is a nominal variable. Highest level of education attained was asked and coded for in an ordinal manner, assigning a 1 to "high school" and a 6 to "doctorate." Participants were asked dichotomous questions including interaction with other's animals, recent military service, sport participation, and day care. Participants were asked to describe their current health status in an ordinal ranking system from excellent to poor, and were asked about medical conditions and medication use, which served as nominal variables. Parents completed the survey for children who were unable to.

The household member that identified themselves as the one who cares for the dog most frequently answered part 3 of the survey. This part extracted basic information about the dog and its health history. Breed, where the dog was obtained what type of food the dog eats (wet, dry, mixture), and medications the dog takes regularly were nominal variables. Gender, whether the dog has been fixed or not, whether the dog has been bred or not, chronic diseases, whether the dog is fed table scraps or not, and if the dog has been to the vet in the last six months were asked in a dichotomous yes/no style. Hair length, and size were ranked in an ordinal system.

Part 4 of the survey was about human's interaction with pet dogs. Using validated instruments, the MDORS and BOOST tools, to gather information about hand washing after interacting with the dog, sleeping location of the dog, where in the house the dog is allowed, time spent interacting with the dog, and how the dog greets visitors and household members (M. V. Boost, O'Donoghue, & James, 2008; M. Boost, O'Donoghue, Him, & Keung, 2008; Dwyer, Bennett, & Coleman, 2006). All of these variables were given an ordinal ranking for analysis.

Once the surveys were complete, the samples were collected. The samples from the humans were collected first. Normal saline solution was used to moisten the nares, and a double–tipped swab was inserted and rotated. For the dogs, a pre moistened swab was used to collect a nasal and peri-anal sample. The samples were processed in the labs using standard procedures to detect SA and MRSA. The results of these laboratory tests were reported dichotomously (positive/ negative).

A code book was developed for data organization and analysis. An abbreviated title was assigned to each variable, and the variables are sorted into nominal, ordinal, and dichotomous categories as previously discussed. Arbitrary numbers were assigned to the nominal variables for organizational and analytical purposes. Ordinal variables were ranked for comparison, and dichotomous "no" variables were assigned a "0", while dichotomous "yes" variables were assigned a "1". SPSS statistics v. 21 was used to analyze the data.

After the code book was developed, the data was cleaned up. The code book showed more dog owners and less dogs than were sampled. Using SPSS statistics, those who had a breed present (meaning they were dogs), and those who were listed as dog owners were selected. Since the dogs are not dog owners, the data under the dog owner column was removed from the data, resulting in 280 dog owners and 123 dogs.

During the analysis portion of the project, additional data was cleaning was performed. When determining human interaction with dogs, some dogs had data. To fix this problem, any observation that had MRDOS data was selected. (Appendix 4 syntax 1). From that group, those with dg=1 (dog owners) and MDROS data were selected. (Appendix 4 Syntax 2). The data that did not contain dg=1 was the data of the dogs who were mistakenly given MDROS data, and this issue was corrected. A cross tabs analysis was performed on the data in order to elicit information regarding interaction and MRSA.

When data to regarding hand washing was analyzed, it was discovered that twelve participants were coded as "4" which was not assigned to hand washing in

the code book. The individual's household ID was recorded, and their original surveys were used to correctly code them. A crosstabs analysis of hand washing and MRSA was performed to obtain the data used in the study. (Appendix 4 syntax 3).

Results:

The participants were residents of suburbs of a large Midwestern city. A total of 489 subjects from 160 householdswere enrolled, 280 (57.2%) of which were dog owners, 209 (42.7%) were non- dog owners. Seventy-one percent of participants were Caucasian (n=438) while 3.9% were African American (n=24). Other races included Asian, Mexican, Puerto Rican, Filipino, Korean, and other. The mean age of participants was 32.5 with a standard deviation of 17.3. The range was 1 month old- 94 years old.

One hundred of 280 (35.7%) dog owners tested positive for SA colonization, while sixty of 209 (28.7%) non dog owners tested positive (p=.062) (Table 1) . Ninety of 280 (32.1%) tested positive for MSSA colonization, while fifty three out of 209 (25.4%) non dog owners tested positive (P=.062) (Table 2). Eleven out of 280 dog owners tested positive for MRSA (3.9%), while 2 out of 209 non- dog owners tested positive for MRSA (1.0%) (p= .037) (Table 3).

Table 1: SA colonization in dog owners and non-dog owners

		any SA		
		positive	negative	
Dog	yes	100 (35.7%)	180 (64.3%)	280
	no	60 (28.7%)	149 (71.3%)	209
		160	329	489

X^2 2.67; 2df; p= .062

SA AND MRSA IN DOG OWNERS AND NON- DOG OWNERS

Table 1: MSSA colonization in dog owners and non-dog owners

		MSSA positive	MSSA negative	
Dog	yes	90 (32.1%)	190 (67.8%)	280
	no	53 (25.4%)	156 (74.6%)	209
		143	346	489

X^2 2.66; 2df; p= .062

Table 2: MRSA colonization in dog owners and non-dog woners

		MRSA positive	MRSA negative	
Dog	yes	11 (3.9%)	269 (96.1%)	280
	no	2 (0.96%)	207 (99.0%)	209
		13	476	489

X^2 4.08; 2df; p= .037

Because MRSA and dog ownership was shown to be statistically significant, the relationship was further investigated. Those who play with their dog, hug, kiss, and interact with their dog while relaxing more frequently had a greater occurrence of MRSA, and this demonstrates a dose response. There appeared to be no

relationship with frequency of taking your dog to visit, giving your dog human food , taking your dog in the car, and buying your dog presents and colonization of MRSA. Those who groom their dog once a month had a higher rate of colonization of MRSA than those who groom their dogs more frequently. (Table 5). Grooming is further discussed in the limitations section.

Table 3: Type of interaction with dog and frequency of interaction among dog owners

Type of Interaction	Interaction with dog: Never	Once a month	Once a week	Every few days	Once a day
Play with	0 (0%)	0 (0%)	4 (1.4%)	12 (4.3%)	264 (94.3%)
Take to visit	85 (30.4%)	146 (52.1%)	27 (9.6%)	10 (3.6%)	12 (4.3%)
Give human food	91 (32.5%)	49 (17.5%)	43 (15.4%)	36 (12.8%)	61 (21.8%)
Take in car	25 (8.9%)	146 (52.1%)	55 (19.6%)	36 (12.9%)	18 (6.4%)
Hug dog	4 (1.4%)	0 (0%)	4 (1.4%)	20 (7.1%)	252 (90%)
Kiss dog	58 (20.7%)	16 (5.7%)	17 (6.1%)	20 (7.1%)	169 (60.4%)
Buy presents	48 (17.1%)	215 (76.8%)	13 (4.6%)	4 (1.4%)	0 (0%)
Interact relaxing	0 (0%)	0 (0%)	5 (1.8%)	10 (3.6%)	265 (94.6%)
Groom dog	19 (6.8%)	164 (58.6%)	73 (26.1%)	19 (6.8%)	5 (1.8%)

Table 4: Type of interaction of dog and frequency of interaction among MRSA positive dog owners

Type of Interaction	Interaction with dog and MRSA positive				
	Never	Once a month	Once a week	Every few days	Once a day
Play with	N/A	N/A	0 (0%)	0 (0%)	11 (4.2%)
Take to visit	2 (2.4%)	8 (5.5%)	0 (0%)	1 (10.0%)	0 (0%)
Give human food	6 (6.6%)	4 (8.2%)	0 (0%)	0 (0%)	1 (1.6%)
Take in car	4 (16.0%)	3 (2.1%)	0 (0%)	4 (11.1%)	0 (0%)
Hug dog	0 (0%)	N/A	0 (0%)	0 (0%)	11 (4.4%)
Kiss dog	1 (1.7%)	1 (6.3%)	0 (0%)	0 (0%)	9 (5.3%)
Buy presents	3 (6.3%)	7 (3.3%)	1 (7.7%)	0 (0%)	N/A
Interact relaxing	N/A	N/A	0 (0%)	0 (0%)	11 (4.2%)
Groom dog	1 (5.3%)	8 (4.9%)	2 (2.7%)	0 (0%)	0 (0%)

Frequency of hand washing after interaction with pet dogs and MRSA correlation was analyzed to determine if hygiene factors effect MRSA transmission. Those who sometimes wash their hands after interaction had a greater occurrence

of MRSA colonization than those who often or always wash their hands after interaction (table 6). Hand washing is further discussed in the limitations section.

Table 5: Hand washing frequency of dog owners after interaction with dog and MRSA colonization

Hand washing after interaction and MRSA

Frequency	Positive	Negative
Never	0 (0%)	21 (100%)
Sometimes	9 (5.3%)	162 (94.7%)
Often	1 (2.0%)	50 (98.0%)
Always	1 (2.7%)	36 (97.3%)

Limitations:

Several limitations arose that may affect the generalizability of this study. Many of our participants were recruited by the snowball effect, so these participants may have had contact with other participants, and MRSA or SA could have been transmitted through other humans or dogs. Jobs of participants was not controlled for, so participants in high risk populations, such as health care workers, could actually have spread MRSA or SA to their family members and pets. While analyzing the data regarding grooming, questions were raised regarding the definition of grooming. Some participants may have viewed frequency of grooming as how often they drop their dog off at the groomers, while others may have answered according

to how often they groom their dogs themselves. Others may consider grooming simply brushing their dog, while others interpreted it as bathing. This discrepancy is important to note, as it impacts the amount of time owners spend interacting with their pet dog.

In a separate issue, bias may have impacted participants response to the hand washing question, so over reporting of hand washing is suspected. Due to resources, the sample size and number of carriers of MRSA or SA detected was too small to be conclusive, but is still suggestive of the relationship between pet ownership and MRSA colonization.

Conclusion:

There are known benefits to pet ownership. The results of this study suggests that there is a relationship between owing a pet dog and MRSA colonization, but not MSSA colonization. Certain behaviors, including playing with a pet dog more frequently, hugging and kissing your dog, and interacting with the dog while relaxing may make pet dog owners more likely to be colonized if proper hygiene measures are not implemented. Further studies should examine the role of hygiene, with better measures for hand hygiene reporting, and infection or colonization of other organisms.

APPENDICIES

1. Participant recruitment information
    a. Flier
    b. Phone information script
    c. ResearchMatch recruitment message

2. Consent information
    a. Adult consent
    b. Child consent
    c. Animal protocol approval

3. Survey

4. SPSS Syntax

Appendix 1

Participants needed

Both dog owners and non-dog owners are needed to help researchers at Ohio State Understand the impact of pets on human health.
During a home visit, participants will answer questions about pet ownership and have nose swabs taken.
For more information, please email petstudy@con.ohio-state.edu or Timothy Landers, CNP, PhD (614 292-0309) or Armando Hoet, DVM, PhD (614 292-0684).

Recruitment material: Phone information script

Thank you for calling. We are conducting a study about the impact of pets, specifically pet dogs on human health and we are looking for both households that have pet dogs and those that do not.

Our project is looking at what types of germs people carry around with them and whether having a pet dog can increase the risk of certain types of bacteria called *Stap. aureus* and MRSA. We know that there are benefits to pet ownership and we want to see if having a pet dog makes a difference in carrying staph around.

In the study, we will have a researcher come to your home and ask some questions about you and your health. We will also take a swab from the inside of your nose with a Q-tip.

If you have a dog, we will also ask you questions about your pet and your interaction with the dog. We would also like to obtain two swabs from your dog – one from the nose and one from the area around its hindquarters.

We will talk about what the results of these swabs might mean and you will have the option to receive results from your swabs and that of your pet dog.

For participating in the study, we will offer you a thank you of $20 per specimen. All of the members of your household can participate, but it is completely voluntary. All of the information is kept confidential and no one else will know your results except for the researchers.

Does this study sound like it might be something you would want to do?

If no -→ Thank you for your time, if you have more questions, please feel free to give me a call back

If yes -> Thank you. Can I ask you a few questions to make sure you are eligible to participate in the study?

1) Have you or anyone in your household engaged in livestock operations such as living on a farm or raising animals in the past 6 months?
2) Have you or anyone in your household worked in the commercial breeding or boarding of dogs in the past 6 months?
3) Have you or anyone in your household boarded dogs as part of a "rescue" or kennel in the past 6 months?

If yes to any of the above: thank you for your time. It looks like you are not going to be eligible to participate. If you have more questions, please feel free to give me a call back.

If no to all of the above: It appears that you will be eligible to participate in the study. C ould we go ahead and set up a time to go over the information about the study and to do the home visit?
[Obtain date, time, address]

ResearchMatch Recruitment Message for This Protocol

PLEASE NOTE: The message that is sent must be under 800 characters. If you'd like advice on making your message as streamlined and concise as possible, please see Rose for advice prior to submitting for IRB approval.

The message placed in the text box below, under photo of the girl and the dandelion and under the email greeting that says: "A research team with The Ohio State University in Columbus, OH, believes you might be good match for the following study" is the message that the volunteers will receive about this protocol. *This initial email will be routed to those ResearchMatch volunteers who fit your inclusion criteria; ResearchMatch will provide hyperlinks at the close of the message that will allow volunteers to respond yes or no to the invitation to release their contact information to this study.* The recruitment language the research team enters into this form SHOULD NOT include identifiable contact information such as email address or phone numbers. This will help ensure that volunteers respond through the ResearchMatch quick links provided in the email message they receive regarding this study. **(Researchers: Feel free to enlarge the text box and move the text below it to the next page if needed.)** Volunteers will see the message. They are asked to click "yes" or "no" in response to the recruitment message. A "yes" response will release their contact information to the researcher. If volunteers click "yes" they are again reminded that their contact information will be released. If the volunteer clicks "no" or ignores the message, the researcher will not receive any information about the potential volunteer.
Sender: do-not-reply@researchmatch.org
Message Subject: ResearchMatch – you may be a good match for this research study!
This window contains the contents of the email that you will be sending out to your selected volunteers. Please proofread and confirm the information you are sending is valid and correct. If you need to make changes, simply click on **'close preview'**. If you want to submit this email message, click on **'contact volunteers'**.

A research team with The Ohio State University in Columbus, OH, believes you might be good match for the following study:

Note to Researcher:
Remember your message can be
NO LONGER THAN 800 CHARACTERS

THE PET STUDY-- Bot **og Owners Can Participate!**

Help researchers at The derstand the impact of pets on human health.

Participation involves:

· A 15-20 minute home visit from the research team.

· Completion of a questionnaire about your household, health, and interactions with pets in the home

· Obtaining a nose swab from participants

· If your household has a pet, there will be an additional questionnaire about your pet and a swab from your pet dog will be obtained.

Participants will receive a $20 stipend upon completion of the home visit.

Yes, I'm interested! No, thanks.

CLOSE PREVIEW

Appendix 2

The Ohio State University Consent to Participate in Research

Role of pet dogs in colonization with *Staphylococcus aureus* and methicillin-resistant *Staphylococcus aureus* (MRSA).

Principal Investigator: Timothy Landers, CNP, PhD

- **This is a consent form for research participation.** It contains important information about this study and what to expect if you decide to participate. Please consider the information carefully. Feel free to discuss the study with your friends and family and to ask questions before making your decision whether or not to participate.
- **Your participation is voluntary.** You may refuse to participate in this study. If you decide to take part in the study, you may leave the study at any time. No matter what decision you make, there will be no penalty to you and you will not lose any of your usual benefits. Your decision will not affect your future relationship with The Ohio State University. If you are a student or employee at Ohio State, your decision will not affect your grades or employment status.
- **You may or may not benefit as a result of participating in this study.** Also, as explained below, your participation may result in unintended or harmful effects for you that may be minor or may be serious depending on the nature of the research.
- **You will be provided with any new information that develops during the study that may affect your decision whether or not to continue to participate.** If you decide to participate, you will be asked to sign this form and will receive a copy of the form. You are being asked to consider participating in this study for the reasons explained below.

1. Why is this study being done?

The purpose of this study is to determine if pets in the household increase the risk of certain bacteria – or germs such as *Staphylococcus aureus* and methicillin-resistant *Staphylococcus aureus (*MRSA). Many people have SA and MRSA but do not develop infections but in some people these germs can be harmful. Pets are an important part of many people's families and we do not know if pet dogs can transmit these germs to their owners or how these germs could be spread.

This study will test people who own pets and those who do not own pets to see if there are differences in the number of people who carry these germs.

2. How many people will take part in this study?

Approximately 500 people will participate in this study.

3. What will happen if I take part in this study?

If you agree to participate in this study, a research assistant will visit your home and ask questions about your health and your home. If you have pets, we will also ask you questions about your pet and how you interact with the pet. Then, we will take a swab from your nose using a clean swab similar to a Q-tip after we put a few drops of a liquid in your nose.

You have the option to find out the results of your swab test which could be "negative," or "positive." A negative test means that we did not find the germ in your sample. A positive test means that the germ (SA or MRSA) was found on your sample. It does not mean that you are infected with SA or with MRSA or that you will become infected. However, some people who have the germ in their nose may be at higher risk for infection (elderly, compromised immune system, HIV/AIDS). A positive test may also mean that if you need to be hospitalized or have surgery, your doctor or nurse may recommend treatment (washes and antibiotics by mouth) to reduce the number of germs.

We will also obtain two swab samples from your dog (near the nose and around the rectum). This study has been approved by the Institutional Animal Care and Use Committee of The Ohio State University.

You do not need to be notified of your results to participate in the study. If you would like to know your results, we will send you a letter with your results 10-14 days after we obtain the swab.

Please indicate your preference in the space below:

☐ YES, I would like to be informed of the results of the swab test.

☐ NO, I would not like to be informed of the results of my test.

4. How long will I be in the study?

The survey and swabs will take approximately 25-30 minutes.

We would also like to contact you to possibly participate in future research studies as well. Please indicate your preference about being contacted for future studies in the space below:

☐ YES, I give permission for the researchers to contact me about future studies

☐ NO, I do not wish to be contacted about future studies.

We would also like to store the swab samples for future research. Storing bacterial samples does not require any participation from you. These samples will be given a "code number" so that your name or other identifying information will not be used. Future studies could include ways to identify certain bacteria using new tests and research on how bacteria are spread. There will not be any identifiable information in the stored specimens. You do not need to have your sample stored in order to participate in the study. Please indicate your preference in the space below:

☐ YES, I give permission for my swab samples to be stored and used in future research studies.

☐ NO, I do not wish to have my samples stored for future research studies.

5. Can I stop being in the study?

You may leave the study at any time. If you decide to stop participating in the study, there will be no penalty to you, and you will not lose any benefits to which you are otherwise entitled. Your decision will not affect your future relationship with The Ohio State University.

6. What risks, side effects or discomforts can I expect from being in the study?

Some people find that the swab is slightly uncomfortable – similar to blowing your nose.

Although efforts will be made to keep your information confidential, the information collected in the study does include personal information that could be harmful if released. This includes information about HIV status, substance use, prison time, and medical information.

There are no other known risks to participating in the study.

7. What benefits can I expect from being in the study?

There are no other benefits to you of participating in this study.

8. What other choices do I have if I do not take part in the study?

You may choose not to participate without penalty or loss of benefits to which you are otherwise entitled.

9. Will my study-related information be kept confidential?

Efforts will be made to keep your study-related information confidential. However, there may be circumstances where this information must be released. For example, personal information regarding your participation in this study may be disclosed if required by state law.

Study information will be stored on a secure (locked) computer and only people who are working on the study will have access to this information. It will also be stored using a special number so that only the people in charge of the study will know your name and identifying information.

Also, your records may be reviewed by the following groups (as applicable to the research):

- Office for Human Research Protections or other federal, state, or international regulatory agencies;
- U.S. Food and Drug Administration;
- The Ohio State University Institutional Review Board or Office of Responsible Research Practices;
- The sponsor supporting the study, their agents or study monitors; and
- Your insurance company (if charges are billed to insurance).

If this study is related to your medical care, your study-related information may be placed in your permanent hospital, clinic, or physician's office records. Authorized Ohio State University staff not involved in the study may be aware that you are participating in a research study and have access to your information.

You may also be asked to sign a separate Health Insurance Portability and Accountability Act (HIPAA) research authorization form if the study involves the use of your protected health information.

10. What are the costs of taking part in this study?

There are no costs to you to participate in this study.

11. Will I be paid for taking part in this study?

Each participant will be paid $20 for participating in the study. For each dog in the study, we will also provide the owner with $20.

By law, payments to subjects are considered taxable income.

12. What happens if I am injured because I took part in this study?

If you suffer an injury from participating in this study, you should notify the researcher or study doctor immediately, who will determine if you should obtain medical treatment at The Ohio State University Medical Center.

The cost for this treatment will be billed to you or your medical or hospital insurance. The Ohio State University has no funds set aside for the payment of health care expenses for this study.

13. What are my rights if I take part in this study?

If you choose to participate in the study, you may discontinue participation at any time without penalty or loss of benefits. By signing this form, you do not give up any personal legal rights you may have as a participant in this study.

You will be provided with any new information that develops during the course of the research that may affect your decision whether or not to continue participation in the study.

You may refuse to participate in this study without penalty or loss of benefits to which you are otherwise entitled.

An Institutional Review Board responsible for human subjects research at The Ohio State University reviewed this research project and found it to be acceptable, according to applicable state and federal regulations and University policies designed to protect the rights and welfare of participants in research.

14. Who can answer my questions about the study?

For questions, concerns, or complaints about the study you may contact Timothy Landers, RN, CNP, PhD at 614 292 0309.

For questions about your rights as a participant in this study or to discuss other study-related concerns or complaints with someone who is not part of the research team, you may contact Ms. Sandra Meadows in the Office of Responsible Research Practices at 1-800-678-6251.

If you are injured as a result of participating in this study or for questions about a study-related injury, you may contact Timothy Landers, RN, CNP, PhD at 614 292 0309.

Signing the consent form

I have read (or someone has read to me) this form and I am aware that I am being asked to participate in a research study. I have had the opportunity to ask questions and have had them answered to my satisfaction. I voluntarily agree to participate in this study.

I am not giving up any legal rights by signing this form. I will be given a copy of this form**.**

Printed name of subject	**Signature of subject**
	AM/PM
	Date and time
Printed name of person authorized to consent for subject (when applicable)	**Signature of person authorized to consent for subject (when applicable)**
	AM/PM
Relationship to the subject	**Date and time**

Investigator/Research Staff

I have explained the research to the participant or his/her representative before requesting the signature(s) above. There are no blanks in this document. A copy of this form has been given to the participant or his/her representative.

Printed name of person obtaining consent	**Signature of person obtaining consent**
	AM/PM
	Date and time

Witness(es) - *May be left blank if not required by the IRB*

Printed name of witness	**Signature of witness**
	AM/PM
	Date and time
Printed name of witness	**Signature of witness**
	AM/PM
	Date and time

The Ohio State University Parental Permission For Child's Participation in Research

Study Title:	Role of pet dogs in colonization with Staphylococcus aureus and methicillin-resistant Staphylococcus aureus.
Principal Investigator:	Timothy Landers, CNP, PhD

- **This is a parental permission form for research participation.** It contains important information about this study and what to expect if you permit your child to participate. Please consider the information carefully. Feel free to discuss the study with your friends and family and to ask questions before making your decision whether or not to permit your child to participate.
- **Your child's participation is voluntary.** You or your child may refuse participation in this study. If your child takes part in the study, you or your child may decide to leave the study at any time. No matter what decision you make, there will be no penalty to your child and neither you nor your child will lose any of your usual benefits. Your decision will not affect your future relationship with The Ohio State University. If you or your child is a student or employee at Ohio State, your decision will not affect your grades or employment status.
- **Your child may or may not benefit as a result of participating in this study.** Also, as explained below, your child's participation may result in unintended or harmful effects for him or her that may be minor or may be serious depending on the nature of the research.
- **You and your child will be provided with any new information that develops during the study that may affect your decision whether or not to continue to participate.** If you permit your child to participate, you will be asked to sign this form and will receive a copy of the form. You are being asked to consider permitting your child to participate in this study for the reasons explained below.

1. Why is this study being done?

The purpose of this study is to determine if pets in the household increase the risk of certain bacteria – or germs such as *Staph. aureus* and MRSA. Many people have SA and MRSA but do not develop infections but in some people these germs can be harmful. Pets are an important part of many

people's families and we do not know if pet dogs can transmit these germs to their owners or how these germs could be spread.

This study will test people who own pets and those who do not own pets to see if there are differences in the number of people who carry these germs.

2. How many people will take part in this study?

Approximately 500 people will participate in this study.

3. What will happen if my child takes part in this study?

If you agree to have your child participate in this study, a research assistant will visit your home and ask him/her some questions about your child's health and your home. If you have pets, we will also ask you questions about your pet and how your child interacts with the pet. Then, we will take a swab from your child's nose using a clean swab similar to a Q-tip after we put a few drops of a liquid in your nose.

You have the option to find out the results of your child's swab test which could be "negative," or "positive." A negative test means that we did not find the germ in the sample. A positive test means that the germ (SA or MRSA) was found on your sample. It does not mean that your child is infected with SA or with MRSA or that he or she will become infected. However, some people who have the germ in their nose may be at higher risk for infection (elderly, compromised immune system, HIV/AIDS). A positive test may also mean that if your child needs to be hospitalized or have surgery, your doctor or nurse may recommend treatment (washes and antibiotics by mouth) to reduce the number of germs.

You do not need to be notified of the results to participate in the study. If you would like to know the results, we will send you a letter with your results 10-14 days after we obtain the swab.

Please indicate your preference in the space below:

☐ YES, I would like to be informed of the results of the swab test.

☐ NO, I would not like to be informed of the results of my test.

4. How long will my child be in the study?

The survey and swabs will take approximately 25-30 minutes.

We would also like to contact you to possibly participate in future research studies as well. Please indicate your preference about being contacted for future studies in the space below:

☐ YES, I give permission for the researchers to contact me about future studies

☐ NO, I do not wish to be contacted about future studies.

We would also like to store the swab samples for future research. These samples will be given a "code number" so that your name or other identifying information will not be used. You do not need to have your sample stored in order to participate in the study. Please indicate your preference in the space below:

6. Can my child stop being in the study?

Your child may leave the study at any time. If you or your child decides to stop participation in the study, there will be no penalty and neither you nor your child will lose any benefits to which you are otherwise entitled. Your decision will not affect your future relationship with The Ohio State University.

6. What risks, side effects or discomforts can my child expect from being in the study?

Some people find that the swab is slightly uncomfortable – similar to blowing your nose. There are no other known risks to participating in the study.

7. What benefits can my child expect from being in the study?

There are no direct benefits to your child for participating in the study.

8. What other choices does my child have if he/she does not take part in the study?

You or your child may choose not to participate without penalty or loss of benefits to which you are otherwise entitled.

9. Will my child's study-related information be kept private?

Efforts will be made to keep your child's study-related information confidential. However, there may be circumstances where this information must be released. For example, personal information regarding your child's participation in this study may be disclosed if required by state law.

Also, your child's records may be reviewed by the following groups (as applicable to the research):

- Office for Human Research Protections or other federal, state, or international regulatory agencies;
- U.S. Food and Drug Administration;
- The Ohio State University Institutional Review Board or Office of Responsible Research Practices;
- The sponsor supporting the study, their agents or study monitors; and
- Your insurance company (if charges are billed to insurance).

If this study is related to your child's medical care, your child's study-related information may be placed in their permanent hospital, clinic, or physician's office records. Authorized Ohio State University staff not involved in the study may be aware that your child is participating in a research study and have access to your child's information.

You may also be asked to sign a separate Health Insurance Portability and Accountability Act (HIPAA) research authorization form if the study involves the use of your child's protected health information.

10. What are the costs of taking part in this study?

There are no costs to participate in the study.

11. Will I or my child be paid for taking part in this study?

You will be paid $20 for participating in the study.

By law, payments to subjects are considered taxable income.

12. What happens if my child is injured because he/she took part in this study?

If your child suffers an injury from participating in this study, you should notify the researcher or study doctor immediately, who will determine if your child should obtain medical treatment at The Ohio State University Medical Center.

The cost for this treatment will be billed to you or your medical or hospital insurance. The Ohio State University has no funds set aside for the payment of health care expenses for this study.

13. What are my child's rights if he/she takes part in this study?

If you and your child choose to participate in the study, you may discontinue participation at any time without penalty or loss of benefits. By signing this form, you do not give up any personal legal rights your child may have as a participant in this study.

You and your child will be provided with any new information that develops during the course of the research that may affect your decision whether or not to continue participation in the study.

You or your child may refuse to participate in this study without penalty or loss of benefits to which you are otherwise entitled.

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If your child is injured as a result of participating in this study or for questions about a study-related injury, you may contact Timothy Landers, RN, CNP, PhD at 614 292 0309.

Signing the parental permission form

I have read (or someone has read to me) this form and I am aware that I am being asked to provide permission for my child to participate in a research study. I have had the opportunity to ask questions and have had them answered to my satisfaction. I voluntarily agree to permit my child to participate in this study.

I am not giving up any legal rights by signing this form. I will be given a copy of this form**.**

Printed name of subject	
Printed name of person authorized to provide permission for subject	**Signature of person authorized to provide permission for subject**
Relationship to the subject	**Date and time** **AM/PM**

Investigator/Research Staff

I have explained the research to the participant or his/her representative before requesting the signature(s) above. There are no blanks in this document. A copy of this form has been given to the participant or his/her representative.

Printed name of person obtaining consent	**Signature of person obtaining consent**
	Date and time **AM/PM**

Witness(es) - *May be left blank if not required by the IRB*

Printed name of witness	**Signature of witness**
	Date and time **AM/PM**
Printed name of witness	**Signature of witness**
	Date and time **AM/PM**

e-Protocol

Date: Friday, November 12, 2010 10:42:58 AM
Section: Protocol Identification

Print Close

Protocol Identification

* **Protocol Title:**	Investigation of Community outbreaks of Methicillin-Resistant Staphylococcus aureus
* **Principal Investigator:**	Armando Hoet
* **Protocol Type:**	Research
* **Academic Unit:**	**Select the principal investigator's academic unit.** • It is important to select the most specific academic unit (which could be a division, department, or a college. • Select Centers only when the PI is not a faculty member (e.g. research scientist). • Choosing an incorrect unit will delay unit endorsement. • Select the icon to the right of this question to read more before selecting the academic unit from the alphabetical menu of OSU "organizations". Veterinary Preventive Med

Appendix 3

Role of Pet Dogs in the Colonization with *Staphylococcus aureus* and methicillin-resistant *Staphylococcus aureus* (MRSA).

Thank you for taking the time to complete this survey which will help us to understand the impact that pets in the home have on human health.

This survey has questions divided in four parts. All four parts of the survey will take approximately 40 minutes to complete.

Part 1- Questions about your households key informant

Part 2- Questions for each individual family member (who consents to the survey).

If you have a dog, we would like to ask you to please complete the two additional parts of the survey.

Part 3- Questions about your pets

Part 4- Questions about how you interact with your pets

Your answers are confidential which means that they will not be shared with anyone outside of our study and will only be used for the purposes of the study.

Part 1: General Household Questions By Key Informant

1. Zipcode	**zip**

2. Number of people in the home	**Fam#**

3. Household members					
Initials	Age	Gender	Initials	Age	Gender
	age	Gndr 1=male 0=female			

4. What is the approximate square footage of your home?	sqf	5. How many bedrooms?	bdrms	6. How many bathrooms?	bthrms

7. How long have you lived in your home	lived

8. Are there any pets in your home?			
Species	Y/N	How many	Type
Dog (Canine) dg	1=Y 0=N	dg#	
Cat (Feline) ct	1=Y 0=N	ct#	
Reptiles/Amphibians * rep_amp	1=Y 0=N	rep_amp#	
Small Mammal**ma	1=Y 0=N	ma#	
Horse*** horse	1=Y 0=N	horse#	
Livestock/ pot belly pig lvs_pig	1=Y 0=N	lvs_pig#	
Fish fish	1=Y 0=N	fish#	

*For example: Turtle, Geckos, Iguanas, Snake
** For example: Rabbit, Guinea Pig, Hamster, Mouse, Rat
*** Small ponies that live within the home

9. What are the occupations of the household members			
Initials	Occupation	Works with animals Y/N	If yes indicated the type of contact*
	occ	1=Y 0=N	

*works in a kennel, veterinary office, pet shop, grooms dog

Participant Initials_____

Part 2: Health of Individual Household Members

1. What is your race?* race				
☐ White 1 ☐ Black, African Am. 2 ☐ American Indian or Alaska Native 3	☐ Asian Indian 4 ☐ Mexican, Mexican Am, 5 Chicano 6 ☐ Puerto Rican 7 ☐ Cuban 8	☐ Hispanic, Latino or Spanish origin 9 ☐ Chinese 10 ☐ Filipino 11 ☐ Japanese 12	☐ Korean 13 ☐ Vietnamese 14 ☐ Native Hawaiian 15 ☐ Guamanian or Chamorro 16	☐ Samoan 17 ☐ Other Pacific Islander 18 ☐ Other Race 19 List other race here:

*These racial categories are the same ones utilized by the 2010 U.S. Census.

2. What is your highest level of education?		
A) For Participants Under 18: What grade are you in?		edA
B) For Participants Over 18: edB		
☐ High School Diploma/GED 1	☐ Bachelor's Degree (BA, BS) 3	☐ Professional degree (MD, DDS, LLB, DVM) 5
☐ Associate's degree (AA, AS) 2	☐ Master's degree (MA, MS, MBA, MPH) 4	☐ Doctorate Degree (PhD, EdD) 6

	Yes	No
4. Do you work on a farm or with livestock? farm4	1	0
5. Do you breed or raise dogs? breed5	1	0

6. When you visit friends' or family members' homes do you interact with their animals? frnds6	1	0
7. Have you been in jail or prison in the last 6 months? (Even if it was for one night) jl7	1	0
8. Have you served in the military in the last 6 months? mil8	1	0

	Yes	No
9. Do you currently play sports? sports9	1	0
10. Do you currently attend day care? dc10	1	0
11. Do you currently attend school or college? sch11	1	0
12. Do you currently have orthopedic implants such as artificial joints or pacemakers? imp12	1	0
13. Have you ridden in an ambulance in the last 6 months? amb13	1	0

14. In the last 30 days how many nights have you spent away from your home? away14	

15. In the last 6 months, how many times have you been to see a doctor in a health care facility? dr15	

Part 2: ½

Participant Initials_____

	Yes	No	Average length of stay
16. Excluding the ER, have you been admitted to the hospital in the last 6 months hsp	1	0	hsp_stay
17. Have you been to the emergency room in the last 6 months? er	1	0	er_stay

18. How would you describe your overall health?					
Health Status health	☐Excellent 4	☐Good 3	☐Fair 2	☐Poor 1	☐Refused 0
Smoking smoke	☐Yes 1	☐No 0			
Cigarettes/Packs Per Day packs					

Ongoing and Chronic Medical Conditions

19. Do you have one of the following chronic conditions (check all that apply) 1=yes 0=no			
☐Diabetes DM	☐Heart Disease HD	☐Heart Attack MI	☐Participant declines to give any information regarding the chronic diseases listed. dec
☐Kidney Disease* KD	☐Liver Disease** LD	☐Lung Disease*** Lng	
☐Cancer CA	☐Skin Rash **** rsh	☐ HIV/AIDS HIV_AIDS	

*Kidney stones, renal failure, dialysis
**cirrosis or hepatitis
***asthma, emphysema, bronchitis
****psoriasis, eczema, acne

20. In the past 6 months have you experienced (Check all that apply) 1=yes 0=no			
☐Skin abscess, boils abs	☐Skin Ulcer ulc	☐Endocarditis end	☐Pneumonia pne

	Yes	No
21. In the past 6 months, has any medical professional told you that you have a staph ("staff") infection or MRSA infection? staph	1	0

Medications

22. Have you taken the following medications in the last 6 months?

Yes/No	Antibiotics atb 1=yes 0=no	Allergy/Asthma Medication allerg 1=yes 0=no	Steroids ste 1=yes 0=no	Other oth 1=yes 0=no
Name	atbnm	allergnm	stenm	othnm
Length of time taken	atbtm	allergtm	stetm	othtm

Part 3: Pet													
Dog's Name:												Date:	Reason:

Part 3: 1/3

	Dog's Name:	Dog's Name:
1. beed1 What is your dog's (dogs') breed?		
2. sz2 What size is your dog(s)? 1 Small(S), 2 Medium (M), 3 Large(L)		
3.hair3 How long is your dog's (dogs') hair? 1 Short (S), 2 Long (L)		
4.gndr4 What is your dog's gender? 1 Male (M),0 Female (F)		
5.age5 What is your dog's (dogs') age?		
6.fxd6 Has your dog(s) been "fixed' (spayed or neutered)? 1 Yes (Y), 0 No (N)		
7.bred 7 If no, have you ever bred your dog(s)? 1=yes 0=no		
8. date8 If so, what date was the last litter born or last pairing?		
9. get9 Where did you get your dog(s)? 1 A Breeder (B), 2 Rescue Center (RC), 3 A Friend (F), 4 Stray (S), 5 As a Gift (G),6 Pet Shop (PS), 7 Other (Please Specify)		
10. vet10 In the last 6 months has your dog(s) been to a veterinary clinic? Yes (Y), No (N) 1=yes 0=no		
11.vdt11 vtrsn11 If so, what was the last date and reason for the visit?	Date:	Date:
	Reason:	Reason:

Dog's Name:					
Dog's Name:					
Dog's Name:					

		12. dz12 Has your dog(s) ever had a serious or chronic disease (if yes, list below your dog(s) name) 1=yes 0=no	13. med13 Do you give your dog(s) any regular medications? If so what is the **Name** and **Frequency Given**. Medications can include flea or tick prevention, heartworm prevention, prednisone.	14.food14 What type of food do you give your dog(s)? 1Wet (W), 2Dry (D), or a	15. scrps15 Do you give your dog(s) table scraps? Yes (Y) No (N) 1=yes 0=no

Part 3: 2/3

16. If yes, how often does the dog(s) receive human food in the following situations? 0 Never (N), 1 Rarely (R) , 2 Sometimes (S), 3 Often (O), 4 Always(A)	Dog's Name				
Dog's Name					

	Dog's Name				
		hnd16 From your hand	bwl16 Leftovers placed in the dog's bowl	plt16 Straight off a person's plate	flr16 From the floor (when dropped)

Part 3: 3/3

Part 4: Questions about Your Interaction with Your Dog(s)

	Initials
1. Who mainly feeds and exercises the dog(s)? dgprsn1	

2. How often do you or a member of your household					
	At least once a day	Once every few days	Once a week	Once a month	Never
Play with your dog(s) MDROS1	4	3	2	1	0
Take your dog(s) to visit other people MDROS2	4	3	2	1	0
Give your dog(s) human food treats MDROS3	4	3	2	1	0
Take your dog(s) in the	4	3	2	1	0

car MDROS4					
Hug your dog(s) MDROS5	4	3	2	1	0
Kiss your dog(s) MDROS6	4	3	2	1	0
Buy your dog(s) presents MDROS7	4	3	2	1	0
Interact with your dog(s) while relaxing (watching TV). MDROS8	4	3	2	1	0
Groom your dog(s) MDROS9	4	3	2	1	0

2. Do you wash your hands after any of these above activities? wsh2			
☐ Never 0	☐ Sometimes 1	☐ Often 2	☐ Always 3

3. How often does your dog(s) sleep in the following places at night?					
	Never	Rarely	Sometimes	Often	Always
Outside BOOSTS1	0	1	2	3	4
Kitchen BOOSTS2	0	1	2	3	4
Basement BOOSTS3	0	1	2	3	4
Bedroom (floor) BOOSTS4	0	1	2	3	4
Bedroom (your bed) BOOSTS5	0	1	2	3	4
Living area BOOSTS6	0	1	2	3	4
Other room BOOSTS7	0	1	2	3	4

	5. Where in your house is your dog(s) allowed to be when you **are** home?	6. Where in your house is your dog(s) allowed to be when you are **NOT** home?
	Yes/No 1=yes 0=no	Yes/No 1=yes 0=no
Everywhere but bedroom	BOOSTH1	BOOSTNH1
Restricted to basement	BOOSTH2	BOOSTNH2
Restricted to downstairs	BOOSTH3	BOOSTNH3
Restricted to kitchen	BOOSTH4	BOOSTNH4
Restricted to living area	BOOSTH5	BOOSTNH5
Restricted to utility area	BOOSTH6	BOOSTNH6
Restricted to outdoors	BOOSTH7	BOOSTNH7
Other (please specify)	BOOSTH8	BOOSTNH8

7. How often does your dog(s) lie on the following:					
	Never	Rarely	Sometimes	Often	Always
Furniture(couch) CHES1	0	1	2	3	4
Beds CHES2	0	1	2	3	4
A person's lap CHES3	0	1	2	3	4

8. Does your dog(s) mainly interact with one particular person? inter8	☐Yes 1	☐No 0

9. If so how many people does your dog(s) interact with? prsnnum9	

	10. In an average day how much time does your dog(s) spend actively **interacting** with people in the household? inter10	11. In an average week, how much time do you spend **grooming** your dog(s)? grm11
0-30 min	0	0
30-60 min	1	1
1-2 hrs	2	2
2-4 hrs	3	3
>4hrs	4	4

12. When your dog(s) **greets visitors**, how often does your dog exhibit the following behaviors?					
	Never	Rarely	Sometimes	Often	Always
Sniffing/nudging CHESV1	0	1	2	3	4
Jumping up CHESV2	0	1	2	3	4
Licking their face CHESV3	0	1	2	3	4
Licking hands CHESV4	0	1	2	3	4
Barking CHESV5	0	1	2	3	4
Growling CHESV6	0	1	2	3	4
Hiding CHESV7	0	1	2	3	4

13. When your dog **interacts with household members**, how often does your dog(s) exhibit the following behaviors?					
	Never	Rarely	Sometimes	Often	Always
Sniffing/nudging CHESH1	0	1	2	3	4
Jumping up CHESH2	0	1	2	3	4
Licking their face CHESH3	0	1	2	3	4
Licking hands CHESH4	0	1	2	3	4
Barking CHESH5	0	1	2	3	4
Growling CHESH6	0	1	2	3	4
Hiding CHESH7	0	1	2	3	4

14. When household members play with your dog(s), how often do you play the following games?

	Never	Rarely	Sometimes	Often	Always
Fetch (ball/other object) CHESP1	0	1	2	3	4
Tug of war (with rag or rope) CHESP2	0	1	2	3	4
Hide and seek CHESP3	0	1	2	3	4
Rough and tumble CHESP4	0	1	2	3	4
Chase CHESP5	0	1	2	3	4
Other (please describe) CHESP6	0	1	2	3	4

Question Number	Comment

Culture Results

Result	Any	SA	MSSA	MRSA	SP	MSSP	MRSP

SA AND MRSA IN DOG OWNERS AND NON-DOG OWNERS

	culture						
MSSA	1	1	1	0	0	0	0
MRSA	1	1	0	1	0	0	0
MSSP	1	0	0	0	1	1	0
MRSP	1	0	0	0	1	0	1
Negative	0	0	0	0	0	0	0
CP/MRCP/MSCP	1	9	9	9	9	9	9

Code coagulase positive as 9
Negative = 0
Positive = 1

KID Isolates

Antimicrobial	Abrev
Gentamicin	GEN
Amikacin	AMK
Ampicillin	AMP
Amoxicillin with Clavunate	AMC
Oxacillin	OXA
Cephalotin	CEP
Cefpodoxime	CPD
Clindamycin	CLI
Erythromycin	ERY
Chloramphenicol	CHL
Enrofloxacin	ENO
Ciprofloxacin	CIP
Tetracycline	TET
Doxycycline	DOX
Sulfamethoxazole with Trimethoprim	SXT
Vancomycin	VAN

Susceptible (S) = 0
Intermediate (I) = 2
Resistant (R) = 1

Appendix 4

```
      CROSSTABS
  /TABLES=MDORS1 MDROS2 MDROS3 MDROS4 MDORS5 MDROS6 MDROS7 MDROS8
MDROS9 BY MRSA
  /FORMAT=AVALUE TABLES
  /CELLS=COUNT ROW COLUMN TOTAL
  /COUNT ROUND CELL.



SAVE OUTFILE='R:\Landers\Pet-MRSA\Pet-MRSA SPSS data
files\RM_2_14a_result_database.sav'
  /COMPRESSED.
GET
  FILE='R:\Landers\Pet-MRSA\Pet-MRSA SPSS data
files\RM_2_14_result_database.sav'.
DATASET NAME DataSet3 WINDOW=FRONT.
USE ALL.
COMPUTE filter_$=(dg=1).
VARIABLE LABELS filter_$ 'dg=1 (FILTER)'.
VALUE LABELS filter_$ 0 'Not Selected' 1 'Selected'.
FORMATS filter_$ (f1.0).
FILTER BY filter_$.
EXECUTE.
FREQUENCIES VARIABLES=MDORS1 MDROS2 MDROS3 MDROS4 MDORS5 MDROS6 MDROS7
MDROS8 MDROS9
  /ORDER=ANALYSIS.



CROSSTABS
  /TABLES=MDORS1 MDROS2 MDROS3 MDROS4 MDORS5 MDROS6 MDROS7 MDROS8
MDROS9 BY MRSA
  /FORMAT=AVALUE TABLES
  /CELLS=COUNT ROW COLUMN TOTAL
  /COUNT ROUND CELL.




DATASET ACTIVATE DataSet3.

SAVE OUTFILE='R:\Landers\Pet-MRSA\Pet-MRSA SPSS data
files\RM_2_14_result_database.sav'
  /COMPRESSED.
DATASET ACTIVATE DataSet3.

SAVE OUTFILE='R:\Landers\Pet-MRSA\Pet-MRSA SPSS data
files\RM_2_14_result_database.sav'
  /COMPRESSED.
CROSSTABS
  /TABLES=wsh2 BY MRSA
```

```
  /FORMAT=AVALUE TABLES
  /CELLS=COUNT ROW
  /COUNT ROUND CELL.
```

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